

WE CLAIM:

1. A method for providing unprotected traffic transported on protection channels in an optical network that provides transport for protected traffic using the protection channels for failover protection and transport for unprotected traffic using idle protection channels, the method comprising:

defining an ordered set of request priority values for requesting use of the protection channels, and priority values for at least two grades of service for the unprotected traffic; and

creating a protection channel access policy for regulating use of the protection channels occupied by unprotected traffic of the at least two grades of service, in response to protection switch requests of corresponding request priority values.
2. The method as claimed in claim 1 wherein defining the ordered set of request priorities comprises prioritizing different types of network management initiated requests for access to protection channels and automated responses to changes in status of a working channel.
3. The method as claimed in claim 2 wherein prioritizing different types of automated responses to changes in a status of a working channel comprises defining request priority values for each grade of service of protection traffic on the working channels, under different network conditions.

4. The method as claimed in claim 3 wherein creating the protection channel access policy comprises assigning each of the at least two grades of service for the unprotected traffic, a priority value that is higher than at least one of the request priority values.
5. The method as claimed in claim 4 wherein assigning comprises assigning a priority value to a first of the at least two grades of service of the unprotected traffic, that is higher than a request priority value related to a signal degrade condition of the working channel.
6. The method as claimed in claim 5 wherein assigning comprises assigning a priority value to a second of the at least two grades of service of the unprotected traffic, that is higher than a request priority value related to a signal fail condition of the working channel.
7. The method as claimed in claim 6 comprising assigning a highest priority value to a network management initiated forced switch request priority value, and lowest priority values to a test request priority value and a manual switch request priority value.
8. A method for handling a protection switch request at a protection switch processor, the method comprising:
receiving the protection switch request for use of a protection channel on a link in an optical network, the protection switch request indicating a request priority;

determining a current occupancy of the protection channel, the occupancy being one of idle, occupied by unprotected traffic associated with one of a plurality of grades of service, and protected traffic switched from a protected working channel with a specific request priority; applying a protection access policy by determining whether the request priority of the switch request is higher than a priority of the occupant, in order to provide conditional access to the data transport capacity based on a relative value of the request priority and the priority of the occupant.

9. The method as claimed in claim 8 wherein applying the protection access policy further comprises:
refusing the switch request if the request priority is less than, or equal to, that of the occupant;
and
admitting the switch request if the protection channel is idle, or the occupant is extra traffic of a lower priority than the request priority.
10. The method as claimed in claim 9 wherein refusing the priority switch request comprises pending the request so that if the occupant releases the protection channel, a network element (NE) that issued the priority switch request is notified.
11. A method for handling a protection switch request received at a network element via a link of an optical network used to transport protected traffic with failover protection to protection channels, and

to transport extra traffic on unoccupied protection channels of the network, the method comprising:

determining a protection channel and a priority value associated with the protection switch request;

determining a priority value associated with data transport capacity reserved by the protection channel by examining an occupancy of the data transport capacity, the occupancy being one of idle, occupied by unprotected traffic with a predetermined grade of service, and occupied by protected traffic switched from a protected working channel; and

applying a protection access policy based on a comparison of the priority value associated with the switch request and the priority value associated with the protection channel.

12. The method as claimed in claim 11 wherein applying the protection access policy comprises:

refusing the priority switch request if the priority value of the switch request is less than or equal to that of the priority value associated with the occupant of the data transport capacity; and

admitting the switch request if the priority value of the switch request is greater than that of the priority value associated with the occupant of the data transport capacity.

13. The method as claimed in claim 12 further comprising performing switch operations to support the protection channel if the protection switch request is admitted.

14. The method as claimed in claim 13 wherein refusing the priority switch request further comprises:
forwarding a protection switch request pended message along the protection channel; and
if the data transport capacity becomes unoccupied, forwarding a message along the protection channel indicating that the data transport capacity is idle.
15. The method as claimed in claim 14 wherein admitting the switch request further comprises forwarding a pre-empted switch request message to a next network element of an occupant protection channel currently using the data transport capacity, to request the occupant relinquish the data transport capacity.
16. A protection switch processor for applying a protection access policy in an optical network that supports protected traffic and extra traffic at predefined grades of service using pre-provisioned working and protection channels, comprising:
means for determining a priority value associated with a protection switch request message for requesting access to a protection channel;
means for determining an occupancy of the protection channel;
means for determining a priority value associated with the protection channel by determining a priority value associated with an occupant of the protection channel if the protection channel is occupied; and

means for comparing the priority value associated with the protection switch request message to the priority value associated with the protection channel to determine which of the priority values is highest.

17. The protection switch processor as claimed in claim 16 further comprising:

means for refusing the protection switch request if the priority value associated with the protection switch request message is less than, or equal to, the priority value associated with the protection channel; and

means for admitting the protection switch request if the protection channel is idle, or the priority value associated with the protection channel is lower than the priority value associated with the protection switch request message.

18. The protection switch processor as claimed in claim 17 wherein the means for admitting the protection switch request further comprises:

means for sending a pre-empted message to respective ends of an occupant protection channel to direct the occupant to relinquish access to the data transport capacity if the occupant is not extra traffic.

19. The protection switch processor as claimed in claim 16 wherein the protection switch processor is instantiated on each network element in the optical network.

20. The protection switch processor as claimed in claim 16 wherein the protection switch processor is instantiated on a network management workstation connected to the optical network.